

VALIDATE TESTING THOROUGHNESS AND PROVIDE APPLICATION ANALYSIS

With potential customers, suppliers and other business groups accessing applications, analysis and testing become even more critical in application development. The ability to target and focus development and testing efforts where they are needed can mean the difference between meeting a deadline and missing it.

Compuware Xpediter/Code Coverage is instrumental in both the analysis and testing phases of application development. In the analysis phase, Xpediter/Code Coverage can help determine exactly what programs and logic are executed for specific business functions. In the testing phase, Xpediter/Code Coverage reports specifically which lines of code have or have not been executed, and, correspondingly, what percentage of a mainframe application has or has not been tested. These measurements allow IT groups to understand the scope and effectiveness of their testing and then to focus their efforts where

needed. Additionally, Xpediter/Code Coverage can identify and extract unique test cases from current batch and IMS regression test data. This helps create more concise and effective test data for quicker, less redundant and less resource-intensive testing.

Through integration with Xpediter/DevEnterprise, users are able to obtain information on the relative risk of placing an application into production as well as comprehensive application and program analysis to put the coverage information into perspective.

	Risk	Verbs Executed	Total Verbs	Branches Executed	Total Branches	Filtered Verbs Executed	Filtered Verbs	Filtered Branches Executed	Filtered Branches
System: ACCOUNTING	914	355(69%)	508	8(22%)	36	6(75%)	8	0(0%)	0
Load Module: TRIDB2P	65	13(94%)	145	0(0%)	0	0(0%)	0	0(0%)	0
Load Module: TRIFP	64	36(61%)	59	6(37%)	16	0(0%)	0	0(0%)	0
Load Module: TRIMAIN2	885	2(3%)	64	0(0%)	16	0(0%)	1	0(0%)	0
TRIMAIN2 (09/17/98-09.43.18)	873	2(8%)	25	0(0%)	2	0(0%)	1	0(0%)	0
Op=N, Debug=N									
TRIFPT2 (03/17/98-09.42.36)	77	0(0%)	21	0(0%)	0	0(0%)	0	0(0%)	0
Op=N, Debug=N									
TRITST2 (09/17/98-09.41.46)	68	0(0%)	18	0(0%)	14	0(0%)	0	0(0%)	0
Op=N, Debug=N									
Load Module: TRIFMPP	502	105(72%)	144	0(0%)	0	6(100%)	6	0(0%)	0
Load Module: XPEDTRAN	52	14(73%)	19	2(50%)	4	0(0%)	0	0(0%)	0
Load Module: XPEDTRNA	66	44(84%)	52	0(0%)	0	0(0%)	0	0(0%)	0
Load Module: XPEDTRNP	883	17(60%)	25	0(0%)	0	0(0%)	1	0(0%)	0
System: ALTER TEST	928	170(67%)	252	41(53%)	76	15(83%)	18	0(0%)	0
System: CODE COVERAGE	904	364(91%)	398	56(80%)	68	9(90%)	10	0(0%)	0
Load Module: BRKRFPM1	904	364(91%)	398	56(80%)	68	9(90%)	10	0(0%)	0
BRKRFPM1 (04/26/00-16.05.23)	455	122(90%)	135	18(81%)	22	2(100%)	2	0(0%)	0
Op=N, Debug=N									
BRKRFPM1 (08/07/00-08.08.55)	459	117(86%)	135	16(72%)	22	2(100%)	2	0(0%)	0
Op=N, Debug=N									
BRKRFPM2 (04/26/00-14.59.46)	875	62(90%)	65	10(83%)	12	2(66%)	3	0(0%)	0
Op=N, Debug=N									
BRKRFPM2 (08/17/00-08.52.18)	455	63(100%)	63	11(81%)	12	3(100%)	3	0(0%)	0
Op=N, Debug=N									
System: DISTRIBUTION	934	824(76%)	1075	73(49%)	148	19(90%)	21	0(0%)	0
System: FINANCE	991	868(54%)	1588	206(51%)	400	85(57%)	149	19(55%)	34
System: INVENTORY	1009	1633(64%)	2539	246(52%)	468	210(62%)	349	2(25%)	8
System: NEW ORDERS	953	212(25%)	847	50(18%)	274	15(71%)	21	0(0%)	0
System: PATHVU RF90260	973	1364(46%)	2933	652(38%)	1714	18(69%)	26	12(75%)	16

Figure 1: Xpediter/Code Coverage allows developers to view execution statistics for all programs within a selected system.

An advanced analysis and testing tool that helps improve and document the quality of testing, Xpediter/Code Coverage enables developers to:

- execute runtime analysis
- quickly understand business functions
- identify all executed programs and logic
- eliminate redundant test cases with batch and IMS test data optimization.

It enables managers to:

- measure, document and report testing efforts, from detailed annotated source listings to system and project summary reports
- understand how “production-ready” programs and applications are, based on their level of testing and their generated “Relative Risk Metric”
- document testing activities for quality or compliance initiatives.

With simple point-and-click navigation, developers can move from a system-level view of programs into source code to assess the riskiest points in the program, aiding and improving the testing effort. Xpediter/Code Coverage requires no source code instrumentation, and it is easily integrated into current testing methodologies.

Combined with the graphical component of Compuware Program Analyzer, Xpediter/Code Coverage analyzes and pinpoints the business functions that are needed to make informed decisions and move on them quickly. After performing the business function analysis of an application, developers can identify areas that require modification and enhancements.

PROVIDE CONSISTENT, RELIABLE AND VERIFIABLE TEST RESULTS

As tests are run, Xpediter/Code Coverage collects test execution statistics. This information — taken from batch (including DB2 Stored Procedures), IMS and CICS programs — is used to populate a repository. The information collected can then be used for a single test execution, multiple tests or multiple tests run over a period of time.

Results are stored hierarchically by the following criteria: system grouping (i.e., payroll, inventory, order entry), load module, specific program, and by compile and optimization date for different versions of the same program.

GENERATE DOCUMENTATION INSTANTLY FOR DETAILED ANALYSIS

The Xpediter/Code Coverage repository provides the basis for reports that document runtime analysis and the thoroughness of testing activity. Generated at the system and program levels, these reports indicate whether testing thresholds have been met. More detailed reports, including verb and branch coverage statistics, can also be generated at the program level.

Create system- and program-level reports by specifying reporting criteria through the filters provided by Xpediter/Code Coverage. These filters can be used to report ad hoc coverage results on specific sections of source code. Developers and testers can select code fields changed specifically to prepare an application for Service-Oriented Architecture, and to help ensure that altered code is tested, both individually and at the system level.

ASSESS RISK AND TARGET TESTING

Examine an application's percentage of unexecuted code and the relative risk it poses in the context of the program's logic structure with Xpediter/Code Coverage. Structure charts provide a graphical look at a program's complexity. The graphical displays of program logic branches are color-coded to indicate the level of code complexity and testing concentration. For example, an aggregate of regression tests may indicate that 60 percent of a modified application has been tested. The graphical view, risk analysis and color-coding information from this aggregate combine to provide IT staff with quantifiable data that helps them determine if additional testing is required or if the critical areas of modified code have been exercised sufficiently.

In addition to a graphical overview of the program structure, the structure charts include statistical information about each paragraph in a program. This information helps developers determine the risk of code failure associated with different parts of a program.

The relative risk metric helps testing staff make educated decisions about where to focus testing time and effort. If a section of code is designated high-risk, and the modified code contains a critical business function, additional test cases may be added to exercise those lines more rigorously.

Relative risk is determined using McCabe metrics, filter information, user-defined fields, execution counts, verb types and a measure of the percent of verbs still unexecuted. Each section of the structure diagram is color-coded to reflect varying levels of risk, and individual measurements are listed in the metrics box.

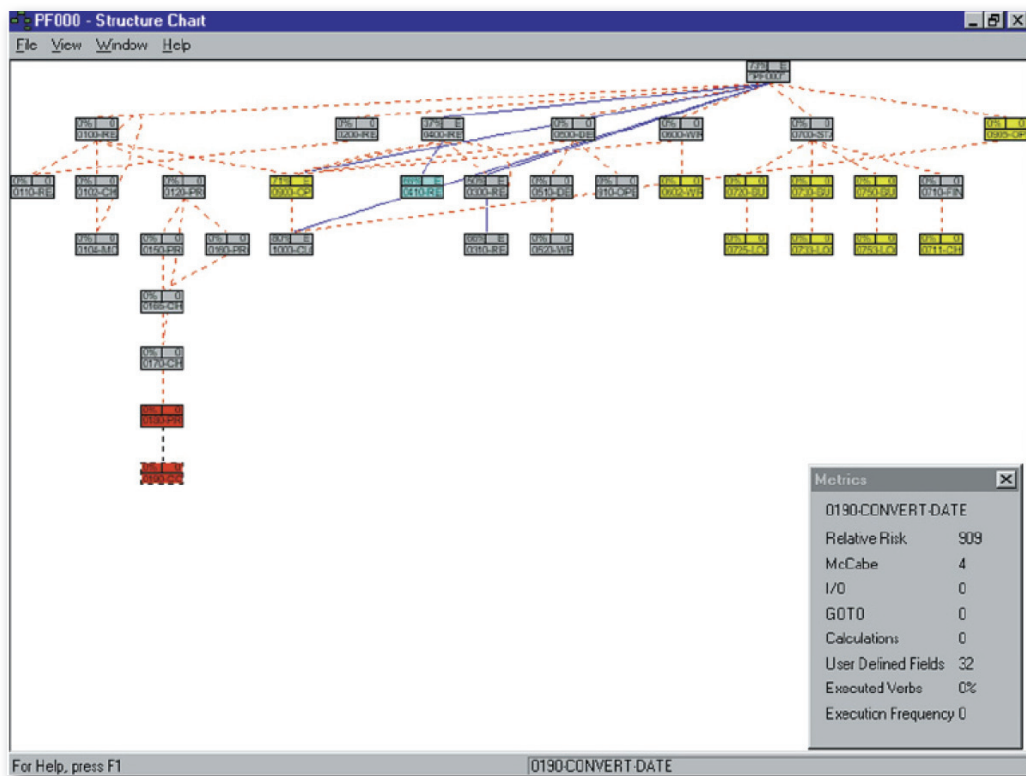


Figure 2: Xpediter/Code Coverage provides developers with a graphical view of their programs. Color coding can be set to identify code not yet executed — even the areas within a program that pose the most risk, based on testing to date.

TEST AND VERIFY CODE CHANGES WITH XPEDITER

Xpediter/Code Coverage data helps developers easily determine how well a given test (or series of tests) actually exercised parts of a program. Developers can use this information to drive testing of untested sections of code from an Xpediter test session. From a structure diagram, developers can click on any unexecuted perform group to set a breakpoint in an Xpediter debugging session. Developers can also set breakpoints on the branches required to execute the path to a particular perform group. These breakpoints enable developers and testers to force execution down a specific path in the program by inserting condition-specific test data.

Xpediter/Code Coverage offers the option of saving the record of breakpoints into a breakpoint script. This script can be reused for multiple testing sessions on the Xpediter workstation component, Compuware Program Analyzer. An interactive workbench, Compuware Program Analyzer integrates easily with mainframe Xpediter to expand code coverage capabilities.

Compuware Program Analyzer gives developers the ability to monitor an entire program or specific statements, and to view the results online. Results can be saved to a file or printed for further analysis or exported to files for record-keeping purposes.

“By focusing test efforts on the highest risk areas of an application, and then guiding developers and testers to increase test coverage of these areas, Xpediter/Code Coverage helps you make the most of the test phase, delivering higher-quality software more quickly.”

— “Seizing New Opportunities to Control Software Maintenance Costs”
Susan Aldrich, Patricia Seybold Group

IMPROVE APPLICATION RELIABILITY WITH COMPUWARE TESTING TOOLS

Organizations that make the investment in Xpediter/Code Coverage will benefit from improved application reliability. The addition of other industry-leading Compuware products can further increase the quality of the testing baseline.

Partnering Code Coverage with Compuware File-AID or Hiperstation improves baseline test data or transaction test scripts. For example, Xpediter/Code Coverage results may indicate that 40 percent of the performance groups in an application remain unexecuted; some of those perform groups contain critical business functions. Use the results to help understand where new test data or new user inputs might be required. File-AID can then help create new test data that can be added to the testing baseline. When additional transactions are required to force execution down additional paths, Hiperstation can be used to capture additional user inputs, and add those inputs to existing test scripts.

To learn more about Xpediter, visit:

www.compuware.com/xpediter

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